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SERIAL NUMBER	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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08/124,980 09/21/93 PIPPIN

B3M1/0507  
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I 42390 P1674  
EXAMINER

PHAN, T

ART UNIT PAPER NUMBER

8

2304  
DATE MAILED:

05/07/96

This is a communication from the examiner in charge of your application.  
COMMISSIONER OF PATENTS AND TRADEMARKS

☐ This application has been examined ☒ Responsive to communication filed on 02/23/96 ☒ This action is made final.

A shortened statutory period for response to this action is set to expire 3 month(s), 0 days from the date of this letter.  
Failure to respond within the period for response will cause the application to become abandoned. 35 U.S.C. 133

**Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:**

- |   |   |
|---|---|
| 1. <input type="checkbox"/> Notice of References Cited by Examiner, PTO-892.        | 2. <input type="checkbox"/> Notice of Draftsman's Patent Drawing Review, PTO-948. |
| 3. <input type="checkbox"/> Notice of Art Cited by Applicant, PTO-1449.             | 4. <input type="checkbox"/> Notice of Informal Patent Application, PTO-152.       |
| 5. <input type="checkbox"/> Information on How to Effect Drawing Changes, PTO-1474. | 6. <input type="checkbox"/>   |

**Part II SUMMARY OF ACTION**

1. ☒ Claims 1-19 are pending in the application.

Of the above, claims \_\_\_\_\_ are withdrawn from consideration.

2. ☐ Claims \_\_\_\_\_ have been cancelled.

3. ☐ Claims \_\_\_\_\_ are allowed.

4. ☒ Claims 1-19 are rejected.

5. ☐ Claims \_\_\_\_\_ are objected to.

6. ☐ Claims \_\_\_\_\_ are subject to restriction or election requirement.

7. ☐ This application has been filed with informal drawings under 37 C.F.R. 1.85 which are acceptable for examination purposes.

8. ☐ Formal drawings are required in response to this Office action.

9. ☐ The corrected or substitute drawings have been received on \_\_\_\_\_. Under 37 C.F.R. 1.84 these drawings are ☐ acceptable; ☐ not acceptable (see explanation or Notice of Draftsman's Patent Drawing Review, PTO-948).

10. ☐ The proposed additional or substitute sheet(s) of drawings, filed on \_\_\_\_\_, has (have) been ☐ approved by the examiner; ☐ disapproved by the examiner (see explanation).

11. ☐ The proposed drawing correction, filed \_\_\_\_\_, has been ☐ approved; ☐ disapproved (see explanation).

12. ☐ Acknowledgement is made of the claim for priority under 35 U.S.C. 119. The certified copy has ☐ been received ☐ not been received ☐ been filed in parent application, serial no. \_\_\_\_\_; filed on \_\_\_\_\_.

13. ☐ Since this application appears to be in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11; 453 O.G. 213.

14. ☐ Other

**EXAMINER'S ACTION**

1. This office action respond to the amendment filed on Feb. 23, 1996.
2. Applicant's arguments filed Feb. 23, 1996 have been fully considered but they are not deemed to be persuasive.
3. The following is a quotation of 35 U.S.C. § 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Subject matter developed by another person, which qualifies as prior art only under subsection (f) or (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

4. Claims 1-19 are rejected under 35 U.S.C. § 103 as being unpatentable over Nelson Pat. No. 4,789,819 in view of Giordano et al. Pat. No. 5,359,236 and Cacciatore Pat. No. 4,799,176.

As per claims 1-3, 8-10 and 15, Giordano et al. disclose an integrated circuit thermal sensor. As shown in Fig. 1A, a portion of a band gap voltage  $KV_{bg}$  is applied between the base and emitter of a bipolar transistor Q1, also referred to as the controlled device. Generally, the band gap voltage applied to the base of Q1

is held at a relatively fixed value as a function of temperature, as shown in Fig. 1B. Temperature sensing is achieved by relying on the well known principle that the base-emitter voltage of a bipolar transistor decreases at a predetermined rate as shown in Fig. 1B. Accordingly, Giordano et al. disclose circuits embodying the invention include a means for generating a turn-on signal which increases with increasing temperature.

Such control voltage V14 which is the control voltage applied to the base of Q1 is proportional to temperature variations, increasing directly and linearly with increasing temperature (see Col. 5 and Fig. 4).

However, Giordano et al. do not call for scaling of the sensing voltage. Such feature is, however, old and well-known in the art. In fact, Nelson discloses a voltage reference circuit including band-gap reference circuit with breakpoint compensation to adjust the temperature coefficient of the reference voltage as a function of temperature. In the design of an analog integrated circuit, it is necessary to establish a voltage or current reference within the circuit which is substantially independent of variations in temperature. A band gap voltage reference circuit often is utilized to provide such a reference voltage or current. Nelson also discloses a scaling factor so as to obtain an output voltage with nominally zero temperature dependence (see Col. 1).

To account for varying threshold voltage detection, Cacciatore disclose a programmable electronic digital thermostat which does

have a capacity of varying thermal setting or threshold voltage as claimed (see abstract). This would motivate practitioners in the art to use the voltage scaling as suggested by Nelson and programmable setting temperature as taught by Cacciatore into Giordano et al.' integrated circuit thermal sensor to obtain a high resolution of output voltage and dynamically adjust temperature setting.

Thus, with the motivation of detecting temperature variation over a wide range, practitioners in the art at the time of the invention would have found it obvious to combine the teachings of Nelson, Giordano and Cacciatore.

As per claims 4-7, 11-14 and 16-19, Nelson and Giordano et al. disclose the claimed invention except for charge scaling or in other words voltage scaling. It would have been an obvious matter of design choice to use MOSFET transistors coupled with resistive elements to provide a voltage scaling. Moreover, such scaling as claimed in the invention is well-known CMOS technology (see Allen and Holberg, "CMOS Analog Circuit Design", HRW, pp. 539-549, 1987).

***Response to Amendment***

Regarding to the Applicant's remarks that the claimed invention requires a programmable input specifying a threshold temperature, generates a scale factor to scale a sensed voltage and comparing the scaled sensed voltage to a reference voltage (see page 3 of the amendment), the examiner respectfully responses to the remarks.

Giordano disclose thermal sensor which uses back gate voltage  $V_{bg}$  and base-emitter voltage to control conduction (see Fig. 1B of the reference). Giordano disclose an effective voltage to turn the device on under effect of temperature variation. Giordano disclose a scale factor  $K$  to control conduction rate of the device (see 1B, Cols. 1 and 5).

Nelson disclose a method of regulating voltage by scaling controlled back gate voltage of the transistor circuit (see Col. 1 and Figs. 1 and 2, and Cols. 1-2 of the reference). This disclosure would be easily applied to small temperature variation as the claimed invention called for. In other words, This is for regulating voltage reference over a small temperature variation.

Cacciatore disclose programmable input feature to thermostat device.

Thus, with the motivation of scaling programmable temperature input to the thermal sensor, practitioners in the art would have found it obvious to combine the teachings of Giordano et al., Nelson and Cacciatore.

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 C.F.R. § 1.136(a).

A SHORTENED STATUTORY PERIOD FOR RESPONSE TO THIS FINAL ACTION IS SET TO EXPIRE THREE MONTHS FROM THE DATE OF THIS ACTION. IN THE EVENT A FIRST RESPONSE IS FILED WITHIN TWO MONTHS OF THE MAILING DATE OF THIS FINAL ACTION AND THE ADVISORY ACTION IS NOT MAILED UNTIL AFTER THE END OF THE THREE-MONTH SHORTENED STATUTORY PERIOD, THEN THE SHORTENED STATUTORY PERIOD WILL EXPIRE ON THE DATE THE ADVISORY ACTION IS MAILED, AND ANY EXTENSION FEE PURSUANT TO 37 C.F.R. § 1.136(a) WILL BE CALCULATED FROM THE MAILING DATE OF THE ADVISORY ACTION. IN NO EVENT WILL THE STATUTORY PERIOD FOR RESPONSE EXPIRE LATER THAN SIX MONTHS FROM THE DATE OF THIS FINAL ACTION.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thai Phan, whose telephone number is (703)305-3812.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist, whose telephone number is (703)305-3800.

Fax communications can be received at (703)305-9724. It is suggested that examiner be informed prior to transmission.

T.P.  
Thai Phan  
May 02, 1996

  
KEVIN J. TESKA  
SUPERVISORY PATENT EXAMINER  
GROUP 2300